suppressive effect of limonin, one of the citrus lemuroids, on intestinal polyp development in *Apc*-mutant Min mice.
Methods: Five-week-old female $Apc^{M9n/+}$ (Min) mice were fed a basal diet (untreated control group; $n = 10$) or a diet containing 500 ppm limonin for 8 weeks (limonin-treated group; $n = 10$). The intestinal tracts were removed and the polyp numbers, sizes and distributions assessed under a stereoscopic microscope. The number of polyps per mouse in each size class is given as mean ± SD values, with statistical analysis using the Student *t*-test.
Results: Administration of 500 ppm limonin to Min mice for 8 weeks did not affect body weight, food intake or clinical signs throughout the experimental period. The total number of polyps decreased in the limonin-treated group compared to those of the untreated control group (34.0 ± 10.5 vs 25.6 ± 5.2; $p < 0.05$). Strong reduction of polyps was observed in the distal part (18.6 ± 7.2 vs 13.2 ± 3.3; $p < 0.05$). Administration of limonin significantly reduced the numbers of polyps sized < 0.5 mm and 1.0 to 1.5 mm in diameter ($p < 0.05$ vs. 0 ppm). Moreover, expression levels of c-Myc mRNA in the polyp part tended to be reduced by administration of limonin.
Conclusions: Our results suggest that limonin might be useful chemopreventive agent against intestinal carcinogenesis.
Funding source(s): The Ministry of Health, Labour and Welfare of Japan.

THE EFFECT OF *CARALLUMA FIMBRIATA* EXTRACT ON METABOLIC PARAMETERS IN HIGH-FAT FED WISTAR RATS

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Background/Aims: The aim of this study was to investigate the effect of an Indian herb, *Caralluma fimbriata* extract on metabolic parameters in Wistar rats fed a high-fat diet.
Methods: Male Wistar rats ($n = 20$) were randomly divided into two groups. After inducing obesity, group two was supplemented with *C. fimbriata* extract for eight weeks, while group one received placebo. The following metabolic parameters were assessed at baseline and post intervention: food intake, body composition, blood pressure, glucose tolerance, insulin sensitivity, urine volume, and sodium excretion. Post intervention organ weights, abdominal circumference, total cholesterol, triglycerides and liver lipid content were measured. Delta change and differences between groups was analysed using Student's *t*-test.
Results: The major findings were a significant reduction in food intake (-0.22 g/day) and abdominal circumference (-1.8 cm) in the *C. fimbriata* supplemented group compared to control ($p < 0.05$). Systolic & diastolic blood pressure was also significantly reduced in the *C. fimbriata* supplemented group compared to baseline (systolic -7.67 mmHg; diastolic -12.41 mmHg).
Conclusions: This study suggests that *C. fimbriata* extract shows potential appetite suppressing, antiobesity and antihypertensive effects on high-fat fed rats. It may play a role in the treatment and management of obesity and metabolic syndrome.
Funding source(s): Victoria University.

FRUIT AND VEGETABLE INTAKE AND BODY MASS INDEX IN A LARGE SAMPLE OF MIDDLE-AGED AUSTRALIAN MEN AND WOMEN

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Background/Aims: Globally, dietary guidelines recommend increased intakes of fruits and non-starchy vegetables for the prevention of chronic diseases.
Methods: Secondary analysis was performed in 246,995 Australian adults aged 45+ years recruited for the "45 and Up" cohort study. The association between BMI and habitual fruit and vegetable (F&V) consumption, assessed using validated short questions was determined using multinomial logistic regression modelling, by sex.
Results: Compared to the referent normal weight category (BMI 18.5 - 24.9 kg/m^2), the odds ratio (OR) of being in the highest vegetable intake quartile was 1.09 (95%CI: 1.04, 1.14) for overweight and 1.18 (95%CI: 1.12, 1.24) for obese women. For fruit, the association was in the opposite direction for overweight (OR 0.85; 95%CI: 0.80, 0.90) and obese (OR 0.75; 95%CI: 0.69, 0.80) women. Obese and overweight women were more likely to meet the "Go for 2&5" targets. In contrast, overweight men were less likely to be in highest intake quartiles for vegetables (OR 0.92; 95%CI: 0.89, 0.96) and fruit (OR 0.94; 95%CI: 0.90, 0.98) but this was not found for obese men.
Conclusions: These data suggest that public health approaches to increase fruit and vegetable intake may be beneficial strategies for weight management in men but further investigation of the positioning of F&V within overall diets is warranted in the case of middle-aged women.
Funding source(s): Sax Institute; Cancer Council NSW, National Heart Foundation; NSW Ministry of Health; *beyondblue*; Department of Family and Community Services; Australian Red Cross Blood Service; UnitingCare Ageing.

DEVELOPMENT OF AN *IN VITRO* ASSAY TO ADEQUATELY ASSESS PLANT PROTEIN DIGESTIBILITY

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Background/Aims: Plant protein digestibility is affected by the presence of starch and the plant cell wall (PCW) as well as physiological changes during upper gastrointestinal (GI) digestion. Hsu's (1977) multi-enzyme method is commonly used to assess plant protein digestibility. However, it does not take into consideration the physiological changes that occur during oral and upper GI digestion phases, and therefore may simplify plant protein digestibility. This study aims to develop an *in vitro* plant protein digestibility assay that represents human digestion adequately by taking into consideration the presence of starch and the physiological changes that occur in the oral cavity to the small intestine (SI).
Methods: Sorghum was used to assess differences in protein digestion between the multi-enzyme method and the proposed enhanced *in vitro* assay. Released protein and peptides were characterised by protein content determination and sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) analysis.
Results: Taking into account the changes that occur with oral and SI digestion improved sorghum protein digestibility to ~25%. Polymeric proteins were able to be further hydrolysed to oligomers and monomers during SI digestion, demonstrating improved digestion.
Conclusions: The increased protein digestibility by including an oral processing indicates that physical breakdown of the PCW and starch is important in enhancing protein digestibility and absorption in the SI. This new enhanced method may be more accurate in determining plant protein digestibility than the commonly used multi-enzyme assay as it takes into consideration bioaccessibility and physiological considerations.
Funding source(s): N/A.

TRANSFORMED OILSEED LAND PLANT PRODUCING LONG-CHAIN *N*-3 OIL: CHARACTERISATION OF LIPIDS FROM DHA-*CAMELINA SATIVA*

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Background/Aims: A need exists for new and renewable sources of the nutritionally important long-chain (≥ 20 carbons) omega-3 PUFA to supplement those from wild fisheries, in particular DHA (22:6*n*-3) used in foods fortified with DHA: infant formula and nutraceuticals, and aquafeeds. We characterised the lipid class and fatty acid (FA) composition and content of a new DHA producing oilseed from the transformed land plant, *Camelina sativa.*
Methods: Lipids were solvent extracted, analysed by Tb-Layer Chromatography with Flame Ionization Detection, fractionated using silica and FA analysed by GC/GC-MS.

Results: Lipid content was 36% of seed weight and rich in TAG (86% of total lipid), 31% lipid was extracted by hexane, providing 96% TAG. Chloroform-methanol extraction of meal recovered a further 4.8% polar lipid (PL) rich extract. The PL were: phosphatidyl choline (69%) and phosphatidyl ethanolamine (13%). DHA composition was 6.8% in TAG, 3.0% in glycolipid and 1.6% in PL. Relative levels of α-linolenic acid (ALA, 18:3*n*-3) in all fractions were higher in transformed seed than in unmodified seed (39-54% versus 12-32%, respectively). The phytosterol profile was similar to unmodified seed.
Conclusions: Camelina could be grown as a new and renewable source of DHA-rich oil for use in animal and aquaculture feeds. Inclusion of this oil in foods may increase dietary intake of DHA and lead to improved *n*-3:*n*-6 status and health outcomes in humans.
Funding source(s): CSIRO.

REQUIREMENTS OF PHYTOCHEMICAL FOOD COMPOSITION DATABASES: COMPARING CURRENT USE IN FOOD INDUSTRY AND BIOMEDICAL RESEARCH

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Background/Aims: Phytochemicals found in plant foods may be linked to disease prevention. Internationally, the recognition of the role of phytochemicals on human health has prompted development of phytochemical FCDs to explore dietary intake data. However such a database is not currently available for Australia. This study aimed to examine requirements of stakeholders surrounding phytochemical food composition databases, comparing to their current use in biomedical research and the food industry sectors.
Methods: A systematic literature review was undertaken to extract English language articles, which used phytochemical food composition databases for their data analysis. Web of Science, Scopus and Medline databases were searched using the time-frame 1999-2014 and keyword combinations; food, nutrient, composition, phytochemical, phytonutrient, flavonoid, alkaloid, phenol, and database.
Results: Thirty four articles met the specified criteria. The majority (56%, $n = 19$) of the studies utilised phytochemical databases for assessing a diet-disease relationship. One or more of the USDA databases (e.g. flavonoid) was used in 38% ($n = 13$) of the studies. Missing values, geographically inappropriate data, and lack of consideration of bioavailability, food processing and cooking methods were limitations to use in the research sector. No literature was available specifically on food industry use of phytochemical databases.
Conclusions: An ideal FCD would comprise of a complete, up to date dataset, which accounts for food analysis, processing, bioavailability and geographical diversity. Further research into the needs and practical use of databases would be beneficial to clarify the findings of this review and aid in future database development.
Funding source(s): NHMRC.

BAOBAB (*ADANSONIA DIGITATA* L.) REDUCES THE GLYCAEMIC AND INSULIN RESPONSE IN HEALTHY VOLUNTEERS

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Background/Aims: Polyphenols have been shown to be able to attenuate disturbances in the postprandial glycaemic response and thus may have important implications for prevention and/or management of T2DM. Baobab (*Adansonia digitata* L.) fruit extract has received attention in the scientific literature recently due to its soluble fibre content. However, we have previously demonstrated that baobab also contains a number of bioactive compounds including polyphenols. The aim of this study was to elucidate the postprandial glycaemic profile following consumption of 50 g available carbohydrate from a functional drink with added baobab extract.
Methods: Seventeen healthy subjects consumed one of three beverages: reference drink glucose-monohydrate (GLU), matched control milk drink (MCON, matched for soluble fibre content), or baobab-enriched milk drink (BAO), in a randomised crossover design and measurements of blood glucose and blood insulin were collected over a 2.5 hour postprandial period.
Results: Incremental area under the curve analysis revealed significant differences between the BAO and MCON drinks for glucose response (20.4 ± 4.2 vs. 30.9 ± 2.4 mmol/L/min respectively; $p < 0.05$) and insulin response (1,745.1 ± 268.1 vs. 2,205.7 ± 400.9 μU/mL/min respectively; $p < 0.05$) using repeated measures ANOVA. Both were also significantly ($p < 0.05$) lower than GLU.
Conclusions: We hypothesise that the phytochemicals within baobab may be responsible for reducing the glycaemic and insulin response. These data add to a growing body of literature to support the potential of baobab as a functional food ingredient.
Funding source(s): Technology Strategy Board and Medical Research Council, UK.

THE LOW FODMAP DIET AND GUT-DIRECTED HYPNOTHERAPY ARE EQUALLY EFFICACIOUS IN PATIENTS WITH IRRITABLE BOWEL SYDNROME

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Background/Aims: Gut-directed hypnotherapy (GDH) is increasingly recommended to IBS patients. Nevertheless, it is difficult to attain high-quality evidence for its efficacy given the constraints of psychologically-based trials i.e. difficulty designing a placebo. An alternative is to compare GDH to a therapy with proven efficacy. This study aimed to determine if GDH is non-inferior in efficacy to the low FODMAP diet (LFD) and to assess whether they have additive effects.
Methods: A randomized controlled trial was performed in IBS patients (Rome-III) comparing (a) LFD (education in week 1, review at week 6); (b) GDH (six one-hour hypnosis sessions for 6 weeks); (c) a combination of both. The primary endpoint was change in overall gastrointestinal symptoms evaluated using a 100 mm visual-analogue-scale (VAS) at 6 weeks and 6 months post-treatment.
Results: Of 74 participants (mean age 40, SD 14; 14 male), 24 received LFD, 25 GDH and 25 combination therapy. The groups were well matched. A significant change in overall gastrointestinal symptoms was observed at week 6, mean VAS = 33.10 mm, 95%CI: 27.78, 38.41, $p < 0.0001$; and 6 months post-treatment, mean VAS = 29.87 mm, 95%CI: 23.20, 36.53, $p < 0.0001$. Improvement of ≥ 20 mm at week 6 was seen in 72% of participants. No difference was observed between treatment groups at week 6 ($p = 0.67$; one-way-between-groups ANOVA) or 6 months post-treatment ($p = 0.16$).
Conclusions: The efficacy for GDH is similar to that of LFD for relief of gastrointestinal symptoms in IBS patients. The benefit of both therapies is maintained long-term. There was no additive effect of combining treatments. GDH is an effective alternative to the LFD.
Funding source(s): Andrea-Joy Logan Scholarship.

IN VITRO AMYLASE DIGESTION OF EXTRUDED MAIZE AND HIGH AMYLOSE MAIZE STARCHES AND EVOLUTION OF STARCH STRUCTURE

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Background/Aims: Starch digestibility influences the calorie intake as well as gastro-intestinal health. High amylose maize starches (HAMS) are known to have greater enzyme resistance than those with lower amylose levels. So far, structural features responsible for the slow digestion of extrudate are not fully understood. The current work is aimed to compare